

Revolving Door

The invention relates to a revolving door according to the preamble of claim 1.

5 Carousel revolving doors are known. In addition to the manually actuated carousel revolving doors, revolving doors comprising an electric motor drive are also known, in particular, those comprising a completely automated microprocessor-controlled drive system. The present invention is based on a carousel revolving door of the latter type.

10 The known carousel revolving doors have externally a stationary cylindrical wall which has two doorways which are generally diametrically opposite one another. These two doorways form essentially a sluice of the carousel revolving door. Within this round cylindrical wall a revolving device with a two-, three- or four-wing live ring is provided and configured such that door leaves extend radially from a central vertical axis. This revolving device is rotated by means of an electric motor so that  
15 the door leaves rotate, and, in this connection, their outer ends are flush with the inner side of the curved cylindrical wall.

20 In emergency situations, when people must leave the building suddenly, such carousel revolving doors present a problem as a result of their relatively minimal throughput capacity. This also holds true for a large number of people as well as for sliding larger objects through it.

For this reason, it is, for example, known from EP 0 715 049 A1 to connect one or several door leaves in a pivotable way to the actual revolving device in order to be able to widen the doorway in this way. The pivoting action of the door leaves can be realized manually or by means of a mechanical drive which, for example, is

controlled by a fire alarm. In order to fix the door leaves in their basic position, a securing magnet correlated with the pivotable door leaf is provided on the revolving frame which cooperates with a magnetic plate of the respective door leaf and secures it by means of magnetic force in the basic position. As soon as the door leaf, for example, as a result of an emergency, is to be pivoted open, the voltage supply to the solenoid is interrupted so that fixation of the door is released and the door leaf can be pivoted open.

This system with the fixation device functions very well in the case of doors with small diameters. However, as soon as the door leaves of large revolving doors become correspondingly large, the revolving device together with its door leaves as a unit becomes instable.

Based on this, the invention has the object to provide a revolving door with an improved fixation device for the pivotable door leaves.

The technical solution of this object is characterized by the features in the characterizing portion of claim 1.

The basic idea of the fixation device according to the invention for pivotable door leaves of a revolving door resides in that the two claws engage the edge of the door leaf like a pair of pliers so that the edge of the door leaf is fixed between the two claws and, in this way, is secured. This fixation device with the two claws is arranged on the revolving frame. By means of this type of fixation, the pivotable door leaves are very stably secured in the basic position. This holds true particularly also for revolving doors of a large diameter.

In principle, it is conceivable that the two claws are transferred into an open

position. The embodiment according to claim 2 suggests, however, that one claw is a stationary stop and only the other claw can be opened for releasing the door leaf.

5 Even though it is conceivable to move the two claws linearly for a transfer into an open position, according to the embodiment of claim 3 it is suggested that the claw for opening (and, in reverse, for closing) is pivotable. This can be realized technically in a simple way by a corresponding rotating or pivoting mechanism. In particular, it is also possible in this way to perform the opening movement without use of a special drive which will be explained in the following.

10 The further development of this embodiment according to claim 4 has the advantage that, by employing a double lever, the claw can be pivoted without problem, i.e., can be transferred into the opening position and, in reverse, into the closing position. The two lever arms of the double lever are arranged on opposed sides of the pivot axis. The double lever can be in an effective connection with a  
15 special pivot device via its free lever arms, for example, with an electric motor or with a pneumatic or hydraulic device.

The preferred technical realization is however suggested by the embodiment according to claim 5. In this case, no special pivot mechanism engages the double lever. The basic idea resides in that in the fixation position of the door leaf the  
20 double lever is secured by the solenoid and, in this way, the door leaf is secured between the two claws. In an emergency situation, the voltage supplied to the solenoid is interrupted so that the double lever with its claw is freely pivotable and the claw can be transferred into the opening position upon pivoting the door leaf. The solenoid is again arranged on the revolving frame.

The embodiment according to claim 6 has the advantage that, as a result of the own gravity of the double lever, the claw is secured safely in the open position. This open position is achieved when, after a certain initial pivot movement, a position has been surpassed whereupon the double lever falls by itself into the open position. Accordingly, the door leaf to be pivoted is released suddenly.

The further development of this embodiment according to claim 7 has the advantage that upon pivoting back of the door leaf into the basic position the double lever with the claw is again transferred synchronously into its fixation position without this requiring a special adjusting drive. In this situation, the solenoid is then again supplied with voltage so that the double lever is secured in its fixation position.

The further embodiment according to claim 8 has the advantage that with the additional spring device, despite the solenoid not being supplied with current, a possible residual magnetism is overcome and, in this way, the door leaf to be pivoted is released instantly.

The embodiment according to claim 9 has finally the advantage that the fixation device with the two claws and the solenoid can be arranged in the roof area of the revolving frame.

One embodiment of a revolving door according to the invention will be explained in the following with the aid of the drawings. It is shown in:

Fig. 1                      a schematic end view of the revolving door;

Figs. 2a and 2b           a schematic plan view onto the revolving door in Fig. 1 with the

door leaves in the basic position as well as in the pivot position;

Fig. 3 a plan view onto the revolving device of the revolving door;

Fig. 4 a plan view onto the fixation device;

5 Figs. 5a and 5b a side view of this fixation device in the closed and the open state of the claws.

The revolving door has a stationary outer cylindrical wall 1 which has two diagonally opposed doorways 2.

10 Within the surrounding cylindrical wall 1 a revolving device 3 with a central axis of rotation D is provided. A total of four door leaves 4 extend radially from this axis of rotation D. The basic position of the door leaves 4 is illustrated in Fig. 2a, i.e., the door leaves 4 are positioned at an angle of 90° relative to one another. The emergency situation is illustrated in Fig. 2b, i.e., a wide passage is to be provided. For this purpose, two oppositely positioned door leaves 4 are rotated by 90° so that  
15 they come to rest against the stationary door leaves 4. The door leaves 4 are then aligned in the direction of the two doorways 2.

For pivoting the door leaves 4, a pivoting device 5 is provided, as schematically illustrated in Fig. 3. In Fig. 3, moreover, a fixation device 6 is illustrated which is correlated with a pivotable door leaf 4 and which ensures that this door leaf 4 is  
20 secured in the basic position so that the door leaf cross of Fig. 2a is realized.

The fixation device 6 has two claws 7, 7' wherein one of the claws 7 is fixedly

arranged on the roof part of the revolving device 3 and projects vertically downwardly. The second claw 7' is part of a double lever 8 which is pivotable about a horizontal axis A. The lower lever arm of this double lever 8 defines the claw 7' while the upper lever arm 9 of the double lever 8 is in an effective connection with a securing and releasing device 10 which is formed by a solenoid 11. The double lever 8 also has a projecting stop 12 extending from the axis A.

The function of the revolving door is as follows:

In the basic position the door leaf 4 is fixed relative to the revolving device 3 in that the two claws 7, 7' engage the upper edge 13 of the door leaf 4, as is illustrated especially in Fig. 5a. In this fixed position, the solenoid 11 which is supplied with current rests against the upper lever arm 9 of the double lever 8 so that the movable claw 7' is secured in its position.

As soon as the door leaf 4 is to be pivoted in order to reach the position in Fig. 2b, the solenoid 11 is no longer supplied with current. This means that the solenoid 11 no longer attracts magnetically the upper lever arm 9 of the double lever 8. The door leaf 4 can be pivoted open by means of the pivoting device 5. The upper edge 13 of the door leaf 4 presses against the claw 7' and pivots the double lever 8 in Figs. 5a and 5b in a counterclockwise direction. As soon as the center of gravity of the double lever 8 is positioned to the left relative to the vertical extending through the axis A, the double lever 8 moves finally into the completely open position so that the claw 7' releases the edge 13 of the door leaf 4. Now the door leaf 4 can be transferred into the completely open position.

In order to transfer the door leaf 4 back into the basic position, it is pivoted back. It comes to rest with its upper edge 16 against the stop 12 of the double lever 8

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and thus pivots the double lever 8 in the clockwise direction until the upper lever arm 9 comes to rest against the solenoid 11. The solenoid 11 is again supplied with current so that the upper lever arm 9 and thus the double lever 8 is locked by the claw 7'. The upper edge 13 of the door leaf 4 is thus secured again between the two claws 7, 7' of the fixation device 6.

## List of Reference Numerals

	1	cylindrical wall
	2	doorway
	3	revolving device
5	4	door leaf
	5	pivoting device
	6	fixation device
	7, 7'	claw
	8	double lever
10	9	lever arm
	10	securing and releasing device
	11	solenoid
	12	stop
	13	edge
15	A	axis
	D	axis of rotation